Jahangirnagar University
Department of Computer Science and Engineering
PMSCS Program, Fall-2021

Course Code: **PMSCS-602** Title: *Object Oriented Programming*
Time: **1.5 hrs** Marks: **30**

Answer any **THREE** of the following questions.

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1. a) Define the terms: (i) Class (ii) Object 2
   b) Explain the impact of three visibility modifiers (private, public, and protected) on class members considering Inheritance. 3
   c) Show three different commenting styles in Java. 2
   d) Write a program that computes your age in minutes. Input to the program is the year, month, day, hour, and minute information of your birth. 3

2. a) Explain few pitfalls to be careful while using loops with example. 3
   b) Imagine a tollbooth at a bridge. Cars passing by the booth are expected to pay 20 tk toll. Mostly they do, but sometimes a car goes by without paying. The tollbooth keeps track of the number of cars that have gone by, and of the total amount of money collected. 5
   Model this tollbooth with a class called tollBooth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both of these to 0. A member function called payingCar() increments the car total and adds 20 to the cash total. Another function, called nopayCar(), increments the car total but adds nothing to the cash total. Finally, a member function called display() displays the two totals. Make appropriate member functions final.
   Include the main function to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the Esc key should cause the program to print out the total cars and total cash and then exit.
   c) How can you organize classes into a package? Illustrate the process of creating a package name *mypkg* that includes a class names *MyClass* class. 2

3. a) Show the state of memory after the execution of each statement in the following code. 2

```
String word1, word2;
word1 = "Hello";
word2 = word1;
word1 = "Java";
```

   b) What is short-circuit evaluation? Explain its significance with example. 3
   c) Consider a system that manages the university bus fare. An administrator shall include buses each having its own fare. He/she can also check total fare collected from each bus. A student can create an account, add balance. Balance is deducted according to the bus category every time he/she rides a bus. You may add few more feature if necessary. 5
      (i) Identify classes involved in this system. Identify their public/private data members and member functions. Draw their class diagrams showing associations and inheritance hierarchy (if any).
      (ii) Implement the system in java.

4. a) Which access specifiers are used in Java? Explain the effect of different access specifiers on the accessibility and visibility level of class members using a comparison table. 3
   b) What is the specialty of *this* pointer? Write a sample program that accesses the members of an 3

object using *this* pointer.

c) Characterize abstract class and abstract method in Java. 2

d) What is assertion? Give expels of two different forms of uses of assertions. 2